Chapter 3

24.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Page 0 | Page 1 | Page 2 | Page 3 |
| 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 2 | 1 | 0 | 1 | 0 |
| 3 | 1 | 1 | 0 | 1 |
| 4 | 0 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 0 |
| 6 | 1 | 1 | 0 | 0 |
| 7 | 0 | 0 | 0 | 1 |

Page 0 : 01101110, Page 1 : 01001001, Page 2 : 00110111, Page 3 : 10001011

26. The page is question has timestamp 1213. Current time is 2204. 2204-1213 = 991. If τ = 400, this page will not be evicted, but if τ = 1000, the page will be evicted.

28a. NRU will evict page 2, as it is the only Class 0 page (not referenced, not modified)

28b. FIFO will replaced page 3, as it was loaded first

28c. LRU will replace page 1, as it was least recently used, but it must be written out to disk

28d. Second chance will remove page 2, as it is the oldest page in memory that has not been referenced.

37.

Chapter 4

2. To work with files whose records can be looked up using a key

3. Without the *open* call, it would be necessary for programs to handle files directly themselves, as well as communicate with other processes about these files. While not necessary, it would result in a lot of overhead in individual programs, instead of re-using common code.

7. Yes, by building a directory structure within the filenames, for example, docs/file1, docs/file2 would be two related files stored in a virtual directory docs, which is just a common prefix on the filename.

11.